Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-10. (Canceled)

11. (Original) A method for producing hydrocarbons from synthesis gas in a slurry bubble reactor, the slurry bubble reactor including a liquid and a catalyst at conversion promoting conditions, wherein the liquid has a density, ρ_L, and viscosity, μ_L, under said conversion promoting conditions and wherein the catalyst comprises a plurality of catalyst particles including fresh catalyst particles, the fresh catalyst particles having a particle density, ρ_P, and particle sizes, d_P, the method comprising the steps of:

(a) selecting the fresh catalyst particles such that the fresh catalyst particles have Archimedes numbers between about 0.02 and about 250, the Archimedes numbers being defined by $Ar = gd_P^3\rho_L(\rho_P-\rho_L)/\mu_L^2$; and

(b) passing a synthesis gas feed stream in said slurry bubble reactor over said catalyst under said conversion promoting conditions to convert at least a portion of said synthesis gas feed stream to hydrocarbons.

12. (Original) The method of claim 11, wherein a majority of said catalyst particles have particle sizes between about 10 and about 250 microns.

13. (Original) The method of claim 12, wherein the catalyst has an effectiveness factor in step (b) greater than about 0.7.

14. (Currently amended) The method of claim 12, wherein the catalyst particles have an average Reynolds number of less than about 0.1, according to the equation $\mathrm{Re}_{avg} = \sum_{i=1}^{M} f_i \mathrm{Re}_i$,

where M is the number of different particle size fractions; f_i is the portion of particles in particle size fraction i, which is determined by dividing the number n_i of particles in size fraction i by the total number N of particles, which is ~~M~~ determined according to $N = \sum_{i=1}^{M} n_i$ [[.]]; and Re_i is the Reynolds number of particles of size fraction i, Re_i being defined according to the equation $Re_i = \frac{\rho_l v D_i}{\mu_l}$, where D_i is the number average particle size of particles in size fraction i.

15. (Original) The method of claim 11, wherein the fresh catalyst particles have Archimedes numbers between about 0.02 and about 100.

16. (Original) The method of claim 11, wherein the fresh catalyst particles have Archimedes numbers between about 0.2 and about 30.

17. (Original) The method of claim 11, wherein at least about 90 percent by weight of the catalyst particles have an Archimedes number between about 0.02 and about 100.

18. (Currently amended) A process for producing hydrocarbons from synthesis gas in a slurry bubble reactor, the slurry bubble reactor including a liquid and a catalyst at conversion promoting conditions, wherein the liquid has a density, ρ_l, and viscosity, μ_l, under said conversion promoting conditions and wherein the catalyst comprises a plurality of catalyst particles including fresh catalyst particles with a particle velocity, v, the method comprising the steps of:

(a) selecting the fresh catalyst particles such that the fresh catalyst particles have Archimedes numbers between about 0.02 and about 250, the Archimedes numbers being defined by $Ar = gd_P^3\rho_l(\rho_P-\rho_l)/\mu_l^2$; and further selecting the catalyst particles such that the catalyst particles have an average Reynolds number of less than about 0.1, according to the equation $Re_{avg} = \sum_{i=1}^{M} f_i Re_i$, wherein M is the number of different particle size

fractions; f_i is the portion of particles in particle size fraction, which is determined by dividing the number *ni* of particles of size fraction *i* by the total number N of particles, said N being determined according to $N = \sum_{i=1}^{M} n_i$ [[,]]; and Re_i is the Reynolds number of particles of size fraction *i*; Re_i being defined according to the equation $Re_i = \frac{\rho_i v D_i}{\mu_i}$, where D_i is the number average particle size of particles in size fraction *i*; and

(b) passing a synthesis gas feed stream in said slurry bubble reactor over said catalyst under said conversion promoting conditions to convert at least a portion of said synthesis gas feed stream to hydrocarbons.

19. (Original) The process according to claim 18 wherein the number average particle size is between about 20 and about 50 microns.

20. (Original) The process according to claim 19 wherein the number average particle size is between about 30 and about 40 microns.

21. (Original) The process according to claim 19, wherein the catalyst has an effectiveness factor in step (b) greater than about 0.7.

22. (Original) The process according to claim 18 wherein at least 90% of the plurality of particles have sizes between about 20 and about 150 microns.

23. (Original) The process according to claim 18 wherein the plurality of particles comprise a substantially log normal distribution of volume percent of catalyst particles versus particle sizes.

24. (Original) The process according to claim 18 wherein the plurality of particles have an average Reynolds number of between about 0.05 and about 0.06.

25. (New) The process according to claim 11 wherein the catalyst comprises a number average particle size between about 20 and about 50 microns.

26. (New) The process according to claim 11 wherein the catalyst comprises a number average particle size between about 30 and about 40 microns.

27. (New) The process according to claim 11 wherein at least 90% of the plurality of particles have sizes between about 20 and about 150 microns.

28. (New) The process according to claim 14 wherein the plurality of particles have an average Reynolds number of between about 0.05 and about 0.06.

29. (New) A method for producing hydrocarbons from synthesis gas in a slurry bubble reactor, the slurry bubble reactor including a liquid and a catalyst at conversion promoting conditions, wherein the liquid has a density, ρ_L, and viscosity, μ_L, under said conversion promoting conditions and wherein the catalyst comprises a plurality of catalyst particles including fresh catalyst particles, the fresh catalyst particles having a particle density, ρ_P, and particle sizes, d_P, the method comprising the steps of:

(a) selecting the fresh catalyst particles such that the fresh catalyst particles have Archimedes numbers between about 0.02 and about 250, the Archimedes numbers being defined by $Ar = gd_P^3\rho_L(\rho_P-\rho_L)/\mu_L^2$; and

(b) passing a synthesis gas feed stream in said slurry bubble reactor over said catalyst under said conversion promoting conditions to convert at least a portion of said synthesis gas feed stream to hydrocarbons, while maintaining a catalyst non-uniformity in said reactor of less than 4.

30. (New) The process of claim 29, wherein the catalyst non-uniformity is less than about 3.

31. (New) The process of claim 29, wherein the catalyst non-uniformity is less than about 2.

32. (New) The process of claim 29, wherein the fresh catalyst particles have Archimedes numbers between about 0.02 and about 100.

33. (New) The process of claim 29, wherein the fresh catalyst particles have Archimedes numbers between about 0.2 and about 30.

34. (New) The process of claim 29, wherein at least about 90 percent by weight of the catalyst particles in said reactor have an Archimedes number between about 0.02 and about 100.